1. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 15$ and choose the interval that $f^-1(15)$ belongs to.

$$f(x) = \sqrt[3]{3x - 4}$$

A. $f^{-1}(15) \in [-1128.5, -1124.2]$

B. $f^{-1}(15) \in [1124.3, 1128.9]$

C. $f^{-1}(15) \in [-1124.2, -1120.8]$

D. $f^{-1}(15) \in [1121.9, 1125.8]$

E. The function is not invertible for all Real numbers.

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2. Find the inverse of the function below. Then, evaluate the inverse at $x = 7$ and choose the interval that $f^-1(7)$ belongs to.

$$f(x) = e^{x+5} - 3$$

A. $f^{-1}(7) \in [-2.55, -2.18]$

B. $f^{-1}(7) \in [-1.84, -0.93]$

C. $f^{-1}(7) \in [-3.14, -2.59]$

D. $f^{-1}(7) \in [6.87, 7.36]$

E. $f^{-1}(7) \in [-0.62, -0.27]$

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3. Find the inverse of the function below. Then, evaluate the inverse at $x = 7$ and choose the interval that $f^-1(7)$ belongs to.

$$f(x) = e^{x-5} + 3$$

A. $f^{-1}(7) \in [5.43, 5.54]$

B. $f^{-1}(7) \in [5.12, 5.31]$

C. $f^{-1}(7) \in [6.27, 6.45]$

D. $f^{-1}(7) \in [3.54, 3.82]$

E. $f^{-1}(7) \in [-3.62, -3.52]$

4. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 6x^4 + 4x^2 + 7x + 3 \text{ and } g(x) = \sqrt{-6x - 27}$$

A. The domain is all Real numbers except $x = a$, where $a \in [6.25, 9.25]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [3.5, 10.5]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-12.5, -1.5]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [1.4, 5.4]$ and $b \in [1.25, 7.25]$

E. The domain is all Real numbers.

5. Determine whether the function below is 1-1.

$$f(x) = 18x^2 - 42x - 196$$

A. No, because there is a y-value that goes to 2 different x-values.

B. No, because the range of the function is not $(-\infty, \infty)$.

C. Yes, the function is 1-1.

D. No, because the domain of the function is not $(-\infty, \infty)$.

E. No, because there is an x-value that goes to 2 different y-values.

6. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = 3x^3 + 2x^2 - 4x - 4 \text{ and } g(x) = 3x^3 + x^2 + 2x + 3$$

A. $(f \circ g)(-1) \in [1.9, 4.3]$

B. $(f \circ g)(-1) \in [-2.4, 0.1]$

C. $(f \circ g)(-1) \in [-2.4, 0.1]$

D. $(f \circ g)(-1) \in [5.6, 7.5]$

E. It is not possible to compose the two functions.

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7. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 12$ and choose the interval that $f^-1(12)$ belongs to.

$$f(x) = \sqrt[3]{5x + 2}$$

A. $f^{-1}(12) \in [-345.36, -344.52]$

B. $f^{-1}(12) \in [345.63, 346.11]$

C. $f^{-1}(12) \in [-346.21, -345.48]$

D. $f^{-1}(12) \in [344.56, 345.27]$

E. The function is not invertible for all Real numbers.

---

8. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = x^3 - 1x^2 - 2x \text{ and } g(x) = -3x^3 + 3x^2 - x - 2$$

A. $(f \circ g)(-1) \in [89, 92]$

B. $(f \circ g)(-1) \in [-13, -8]$

C. $(f \circ g)(-1) \in [81, 89]$

D. $(f \circ g)(-1) \in [-2, 0]$

E. It is not possible to compose the two functions.

---

9. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{3}{4x - 23} \text{ and } g(x) = \frac{2}{4x - 29}$$

A. The domain is all Real numbers except $x = a$, where $a \in [6.67, 12.67]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-12, 1]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [0.4, 5.4]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-2.25, 7.75]$ and $b \in [6.25, 10.25]$

E. The domain is all Real numbers.

---

10. Determine whether the function below is 1-1.

$$f(x) = 18x^2 + 15x - 375$$

A. No, because the domain of the function is not $(-\infty, \infty)$.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because there is a y-value that goes to 2 different x-values.

D. Yes, the function is 1-1.

E. No, because the range of the function is not $(-\infty, \infty)$.

---

11. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -14$ and choose the interval that $f^-1(-14)$ belongs to.

$$f(x) = 3x^2 + 5$$

A. $f^{-1}(-14) \in [2.77, 3.81]$

B. $f^{-1}(-14) \in [2.33, 3.07]$

C. $f^{-1}(-14) \in [5.4, 6.07]$

D. $f^{-1}(-14) \in [0.99, 1.76]$

E. The function is not invertible for all Real numbers.

---

12. Find the inverse of the function below. Then, evaluate the inverse at $x = 10$ and choose the interval that $f^-1(10)$ belongs to.

$$f(x) = e^{x-5} - 2$$

A. $f^{-1}(10) \in [-2.64, -2.2]$

B. $f^{-1}(10) \in [7.04, 7.51]$

C. $f^{-1}(10) \in [0.21, 1.68]$

D. $f^{-1}(10) \in [-0.58, -0.36]$

E. $f^{-1}(10) \in [-0.38, 0.5]$

---

13. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x-5} - 5$$

A. $f^{-1}(8) \in [7.2, 8]$

B. $f^{-1}(8) \in [-3.8, -1.4]$

C. $f^{-1}(8) \in [-6.4, -2.6]$

D. $f^{-1}(8) \in [-3.8, -1.4]$

E. $f^{-1}(8) \in [-6.4, -2.6]$

---

14. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{2}{5x - 28} \text{ and } g(x) = 4x^2 + 6x + 2$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-0.4, 7.6]$

B. The domain is all Real numbers except $x = a$, where $a \in [-0.4, 6.6]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [0.5, 9.5]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [4.17, 12.17]$ and $b \in [3.25, 8.25]$

E. The domain is all Real numbers.

---

15. Determine whether the function below is 1-1.

$$f(x) = 18x^2 + 312x + 1014$$

A. No, because the range of the function is not $(-\infty, \infty)$.

B. No, because there is an x-value that goes to 2 different y-values.

C. Yes, the function is 1-1.

D. No, because there is a y-value that goes to 2 different x-values.

E. No, because the domain of the function is not $(-\infty, \infty)$.

---

16. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = x^3 + 4x^2 - 3x - 3 \text{ and } g(x) = 3x^3 - 1x^2 - x - 1$$

A. $(f \circ g)(1) \in [4.2, 9.3]$

B. $(f \circ g)(1) \in [-7.2, -3.6]$

C. $(f \circ g)(1) \in [-3.9, 0.9]$

D. $(f \circ g)(1) \in [1.7, 4.4]$

E. It is not possible to compose the two functions.

---

17. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 12$ and choose the interval that $f^-1(12)$ belongs to.

$$f(x) = 5x^2 + 3$$

A. $f^{-1}(12) \in [1.53, 2.27]$

B. $f^{-1}(12) \in [2.76, 3.9]$

C. $f^{-1}(12) \in [0.8, 1.48]$

D. $f^{-1}(12) \in [4.01, 5.49]$

E. The function is not invertible for all Real numbers.

---

18. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = -x^3 + x^2 - x \text{ and } g(x) = -x^3 + 4x^2 + 4x$$

A. $(f \circ g)(-1) \in [13, 17]$

B. $(f \circ g)(-1) \in [-2, 0]$

C. $(f \circ g)(-1) \in [-12, -5]$

D. $(f \circ g)(-1) \in [21, 23]$

E. It is not possible to compose the two functions.

---

19. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-6x - 19} \text{ and } g(x) = 4x^2 + 6x + 4$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-3.17, -1.17]$

B. The domain is all Real numbers except $x = a$, where $a \in [4.17, 11.17]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [0.6, 9.6]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [6.25, 11.25]$ and $b \in [3.2, 10.2]$

E. The domain is all Real numbers.

---

20. Determine whether the function below is 1-1.

$$f(x) = 9x^2 + 120x + 400$$

A. No, because the range of the function is not $(-\infty, \infty)$.

B. Yes, the function is 1-1.

C. No, because the domain of the function is not $(-\infty, \infty)$.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because there is a y-value that goes to 2 different x-values.

---

21. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^-1(-15)$ belongs to.

$$f(x) = 5x^2 + 4$$

A. $f^{-1}(-15) \in [2.55, 3.24]$

B. $f^{-1}(-15) \in [0.22, 1.57]$

C. $f^{-1}(-15) \in [5.71, 6.76]$

D. $f^{-1}(-15) \in [1.92, 2.48]$

E. The function is not invertible for all Real numbers.

---

22. Find the inverse of the function below. Then, evaluate the inverse at $x = 9$ and choose the interval that $f^-1(9)$ belongs to.

$$f(x) = e^{x-5} - 2$$

A. $f^{-1}(9) \in [-0.52, 0.09]$

B. $f^{-1}(9) \in [6.77, 7.99]$

C. $f^{-1}(9) \in [-0.67, -0.3]$

D. $f^{-1}(9) \in [-2.85, -2.48]$

E. $f^{-1}(9) \in [0.5, 1.03]$

---

23. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x-2} - 3$$

A. $f^{-1}(8) \in [3.79, 5.33]$

B. $f^{-1}(8) \in [0.3, 0.72]$

C. $f^{-1}(8) \in [-1.81, -1.38]$

D. $f^{-1}(8) \in [-0.85, -0.59]$

E. $f^{-1}(8) \in [-1.27, -1.04]$

---

24. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{4}{6x+29} \text{ and } g(x) = \frac{4}{4x-17}$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-8.33, 4.67]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-4.25, -2.25]$

C. The domain is all Real numbers except $x = a$, where $a \in [-9.17, -1.17]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-8.83, -2.83]$ and $b \in [4.25, 8.25]$

E. The domain is all Real numbers.

---

25. Determine whether the function below is 1-1.

$$f(x) = -36x^2 - 342x - 756$$

A. No, because the domain of the function is not $(-\infty, \infty)$.

B. No, because there is a y-value that goes to 2 different x-values.

C. Yes, the function is 1-1.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because the range of the function is not $(-\infty, \infty)$.

---

26. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = -x^3 + 2x^2 + 2x - 2 \text{ and } g(x) = -4x^3 - 2x^2 + x$$

A. $(f \circ g)(-1) \in [-3, 5]$

B. $(f \circ g)(-1) \in [-3, 5]$

C. $(f \circ g)(-1) \in [-6, -1]$

D. $(f \circ g)(-1) \in [-8, -5]$

E. It is not possible to compose the two functions.

---

27. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 14$ and choose the interval that $f^-1(14)$ belongs to.

$$f(x) = 5x^2 + 3$$

A. $f^{-1}(14) \in [5.96, 6.85]$

B. $f^{-1}(14) \in [3.46, 3.64]$

C. $f^{-1}(14) \in [1.66, 2.16]$

D. $f^{-1}(14) \in [1.43, 1.51]$

E. The function is not invertible for all Real numbers.

---

28. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = 4x^3 + x^2 - x - 1 \text{ and } g(x) = -x^3 - 1x^2 + x$$

A. $(f \circ g)(-1) \in [21, 24]$

B. $(f \circ g)(-1) \in [-9, 1]$

C. $(f \circ g)(-1) \in [11, 16]$

D. $(f \circ g)(-1) \in [3, 7]$

E. It is not possible to compose the two functions.

---

29. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-6x - 23} \text{ and } g(x) = 7x^2 + 4x + 8$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-10, -5]$

B. The domain is all Real numbers except $x = a$, where $a \in [-6.67, -3.67]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-8.83, 4.17]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-0.75, 9.25]$ and $b \in [4.25, 6.25]$

E. The domain is all Real numbers.

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30. Determine whether the function below is 1-1.

$$f(x) = -12x^2 - 57x - 63$$

A. Yes, the function is 1-1.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because the domain of the function is not $(-\infty, \infty)$.
